SMART SECURITY SYSTEM FOR SENSITIVE AREA BY USING IMAGE PROCESSING

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Abstract —: This project describes Security system for banks. It is very suitable for remote monitoring of confidential area. The idea behind developing this system is that there are many security systems which contain CCTV with much Functionality which continuously capture the video and leads to wastage of memory. We are going to develop this system because the previous security systems only capture video which will be used as evidence after the attack is done but the system which we are going to introduce is not only capture the video but also take the appropriate action to prevent the attack. Without using motion sensors webcam will record live video whenever there is an intrusion in the room. Administrator can send commands to control switch on/off of the device through mobile. It can store mobile numbers for all the administrators/owners who need to be contacted in case of emergency. The system keeps track/log of all the activities. Hence detailed record of messages sent and received is maintained. Admin can see the live streaming of the attack and take appropriate action. If admin will not response then system will take action.

Keywords —: Live streaming, remote monitoring, surveillance, User.

I. INTRODUCTION

This project describes mobile based remote home control and surveillance architecture without using motion sensors (hardware+IR). It is very suitable for remote home monitoring etc. The idea is to set up a computer terminal equipped with 2/3 web cameras and a J2ME phone at home (which can be used to control the camera’s connected to the PC by the administrator/owner). Project provides recording and capture image from multiple cameras. To developed smart video security for banking system. Overcome the memory loss of the storage. Enhance the security of the banking system. CCTV not only captures the image when incident is happening. Also alert the system. We are applying the all concept which actually improve the video security system and give idea to improve the working of the image processing activity. Also main role perform by the software each step of the algorithm is specify in well format. In the Image processing system we are apparently dealing with operating system feature.

II. SYSTEM FEATURE

Bank security system is secure by the CCTV camera so that all access of that application is provides to the administrator and owner of the bank. The server farms have features such as the latest cooling systems and service optimization techniques which individual educational institutions are unlikely to be able to afford. “Infinite” scalability a key feature of java application is its rapid elasticity, allowing for sudden peaks in demand and giving the security to the impression that the services are infinitely scalable.

1) SMS : It is a Short Message Service is the text communication service component of phone, web or mobile communication systems, using standardized communications protocols that allow the exchange of short text messages between fixed line or mobile phone devices.

In the Image processing system we are apparently dealing with operating system feature.
2) GPRS: General packet radio service is a packet oriented mobile data service on the 2G and 3G cellular communication systems global system for mobile communications (GSM). The service is available to users in over 200 countries worldwide.

3) J2EE: The Java 2 Platform, Enterprise Edition defines the standard for developing multitier enterprise applications. The J2EE platform simplifies enterprise applications by basing them on standardized, modular components, by providing a complete set of services to those components, and by handling many details of application behavior automatically, without complex programming.

2.2 Purpose and scope
This project deals with developing application in order to provide smart video security system for the banks. This is achieved by using image processing and OpenCV operation. We deal with the problem of implementing security system by using the simple concept of CCTV and by performing operation on that we develop the operational system. This problem tries to obtain and verify a proof that the data that is stored by a user at a remote data storage in database. In this system large amount of security is provided to the bank system all problems related with video can overcome. Such checks must allow the data owner to efficiently, frequently, quickly and securely verify that the security system and get the live operation on his phone.

III. DESIGN AND IMPLEMENTATION.

1) Remote access can be provided by almost any communications means possible.
2) User can either log on to home server via internet connection and control/monitor using appropriate authentication.

3) Alternatively user can control the system using SMS messages. A short application written for mobile can also take care of sending the messages from users mobile to home server Android Mobile. This will eliminate the need for the mobile user to remember the long keyword a control, etc.

4) In case none of the above communication means are possible, user can simply use email to send authenticated mails to home server account and control the system.
5) Proper authentication using mobile number, email id, and passwords is done before the user is allowed to control/monitor the home server.
6) Using a camera and motion detection algorithm user is also informed about any intrusion and the image/video is transmitted online.
7) User can also send a series of command sequences scheduled for a later time. The commands will be executed automatically at the server when the time arrives. The commands may include activating / Deactivating a relay, setting threshold, etc.
8) Live Streaming Over Mobile Phone

3.2 How system and Alert Contributes to Flexibility

The administrator starts the video surveillance system. As soon as the surveillance system is started, the system checks if the web camera is connected or not. If the web camera is not connected to the system then it will display an error messages. Otherwise, the system continuously starts capturing images. A standard image is already stored in a separate file. The captured images are compared with this standard image and are checked for any intrusion. In case of intrusion, a SMS will be sent to the administrator/owner for appropriate action to be taken.

[Diagram of System Architecture]

[Diagram of System Implementation]
User can then login to the surveillance web application to view the most recent videos. The system waits for a specified amount of time for response commands (SMS) from any of the owners, after which it takes necessary action itself.

3.3 Nonfunctional Requirements

3.3.1 Performance Requirements

The performance requirements for software are stated below. The product as will be developed in Java, it will be platform independent. Hence, it will only require JVM of the underlying O.S. The memory requirement as such is not predicted at this time, but product should be optimal to use. For the database we can use any type of software of file system. The above stated requirements are the initial estimated values which will vary as according to the amount of users signing up for the account and traffic load on the server.

3.3.2 Security Requirements

The sensitive data is processed outside the environment within the physical infrastructure of a third party.

- Image Processing
- Privileged user access.
- Regulatory compliance.
- Data safety and segregation
- Storage, backup and recovery of data, including response times
- Support, including investigative support, when needed
- Reporting

3.3.3 Safety Requirement

Safety is the degree to which accidental harm is properly addressed (e.g., prevented, identified, reacted to, and adapted to).

3.3.4 Software Quality Attributes

- Verify Content Quickly
- Software Project Management

4.1 Study of Algorithm

Euclidean Distance Method Algorithm This is used for comparing two images to detect motion. The Euclidean distance computation using square root algorithm, between two points in Cartesian coordinates can be expressed as

\[ d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2} \]

Where \( x_1 \) and \( y_1 \) are the co-ordinates of the received signal and \( x_2 \) and \( y_2 \) are the co-ordinates of the nth constellation point in two dimensional space. The distance expression can then be written as

\[ d = \sqrt{a^2 + b^2} = c \]

This calculation process needs an adder, divider, multiplier and a square-rooter circuit, which intern needs large silicon area and also process is time consuming. Therefore in high speed, low cost implementations, computation process algorithm play a major role. On the other hand the Euclidean distance can be visualized as the hypotenuse of the triangle with sides ‘a’ and ‘b’. In the right angled triangle the length of hypotenuse is a function of the two sides. To understand clearly a graph of distance for different values of the sides ‘a’ and ‘b’ (preferably arbitrarily chosen values of the triangle, ranging over the possible limits, is drawn as shown (a). In QAM applications, the distance between the constellation points depends on scaling factors used for modulation. The distance graph is approximated as a set of ordered straight line segments with slope of the straight lines are tuned such that they are digitally implementable. Lesser the straight line segments require lesser number of hardware’s to implement. The distance plot reveals that, the distance function can be best approximated using two straight lines segments as

\[ d = \max(a, b) + \frac{\min(a, b)}{4} \]

It is very interesting to note that the distance computation just requires only one adder and a shift register. This can be implemented using the combinational logic circuits and hence definitely faster. The error with this approach is to a maximum of 6.7%. A better distance function approximation, is attempted to make this as an acceptable solution, wherein the distance is expressed as

\[ d = \max(a, b) \]

IV. TECHNICAL SPECIFICATION

5.1 Software requirement:

- Java
- Apache tomcat server
- My SQL
- Eclipse:
  Eclipse is an open source community whose projects building tools and frameworks are used for creating
Smart Security System For Sensitive Area By Using Image Processing

In general, the Eclipse Foundation provides four services to the Eclipse community:
1) IT Infrastructure,
2) IP Management,
3) Development Process,
4) Ecosystem Development.

5.2 Hardware requirement:
- Server side System will be windows based supporting versions windows XP onwards.
- The minimum configuration required on server platform.
- 2.4 GHZ, 80 GB HDD for installation
- 512 MB RAM.
- PC
- Network Cards
- Android Phone
- Two Cameras

5.3 Legal Requirements:
- Static IP: To register Static IP (Rs. 2000-2500 p.a required)
- Internet connection: Minimum speed 2-4 mbps. For internet connection any Internet Service Provider (ISP) like Airtel, Reliance, and BSNL Idea etc can be used.

V. MODULE WORKING IN THE PROJECT.

In the module working diagram there are different modules we are using in that everyone perform the specific work. On that basis they were going to send the result to another module and that will send the result to another module.

Step 1: In the first stage of system authenticate user of the banking system login on the server and register their authentication.

Step 2: Authenticate user now start both the cameras of the system and store the template in the file. This image is the part of sensitive area use as reference in the system. This system is completely responsible for alert procedure.

Step 3: Now authenticate user start the system and our system start executing the module. In this module CCTV camera continuously send the footage to the alert module.

Step 4: When any intrusion is detected in the template image. It displays the alert message to the administrator. This message is also alert the nearest police station. When it blows the alarm system, it starts live streaming in the android cell phone.

Step 5: Live streaming display on the android system, respective action should be taken.
VI. PROJECT ESTIMATION

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<th>Description</th>
<th>Quantity</th>
<th>cost</th>
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<tbody>
<tr>
<td>1</td>
<td>laptop</td>
<td>Intel core i3 processor, 3GB RAM, 380 GB Hard drive</td>
<td>2</td>
<td>55,000</td>
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<tr>
<td>2</td>
<td>Camera</td>
<td>CCTV camera</td>
<td>2</td>
<td>5000</td>
</tr>
<tr>
<td>3</td>
<td>Others</td>
<td>Documentation, internet charges etc.</td>
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<td>1500</td>
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<td></td>
<td></td>
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7.1 Advantage:- 1. It consumes less memory.
2. Unnecessary video cannot be recorded.
3. We can take the action during the attack.
4. Admin can see live streaming and take action.

7.2 Disadvantages:- 1. It completely based on video surveillance, so if any interrupt happen then it may affect the system.
2. Alarm system is very sensitive, continuous observation is requiring.
3. Live streaming apps always in the Wi-Fi area.

7.3 Applications of Project
1. This project will prevent the attack by taking appropriate action.
2. Admin can see live streaming of attack.
3. It will save computer memory.
4. It will save time during analysis of recorded video.

7.4 Maintenance:- For providing maintenance of application following decision are taken.
1. We have to provide maintenance to this project in every week or one day gap.
2. Provide the maintenance to Web Service within a month.
3. Database of this project should maintain with time.

CONCLUSION:

Smart surveillance systems significantly contribute to situation awareness. Such systems transform video surveillance from data acquisition tool to information and intelligence acquisition systems. Real-time video analysis provides smart surveillance systems with the ability to react in real-time.

Our system senses the intrusion and sends notifications to authorized persons so that action can be taken in response to the intrusion.

- Thus this security system will help us to:
  - Save memory
  - Save time Take immediate
  - Action during attack not after the attack is done.

So we will use it where we require security. This project describes Security system for banks. It is very suitable for remote monitoring of confidential area. Without using motion sensors webcam will record live video whenever there is an intrusion in the room.

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REFERENCES